

Department of Water Resources

California Irrigation Management Information System

Crop Coefficients (Kc) Explained

Crop coefficients (Kc) are used with ETo to estimate specific crop evapotranspiration rates. The crop coefficient is a dimensionless number (usually between .1 and 1.2) that is multiplied by the ETo value to arrive at a crop ET (ETc) estimate. The resulting ETc can be used to help an irrigation manager schedule when an irrigation should occur and how much water should be put back into the soil. An example calculation follows:

If, ETo = 0.25 inches/day (for July 15, 1985) and, Kc = 0.55 (for an orange tree in July) then, ETc = ETo x Kc = 0.25 inches/day x 0.55 = 0.1375 or 0.14 inches/day

Crop coefficients vary by crop, stage of growth of the crop, and by some cultural practices. Citrus trees have smaller coefficients than peach trees (when the peach tree is at full cover). Coefficients for annual crops (row crops) will vary widely through the season, with a small coefficient in the early stages of the crop (when the crop is just a seedling) to a large coefficient when the crop is at full cover (the soil completely shaded). Almond orchards with cover crops between tree rows will have larger coefficients than almond orchards without cover crops.

It is very important to understand that the crop coefficients that should be used with CIMIS ETo (with grass as the reference crop) are those that were developed specifically for use with grass-referenced ETo.

The University of California Cooperative Extension has prepared two leaflets on crop coefficients: Leaflet #21427 - "Using Reference Evapotranspiration (ETo) and Crop Coefficients to Estimate Crop Evapotranspiration (ETc) for Agronomic Crops, Grasses, and Vegetable Crops" and Leaflet #21428 - "Using Reference Evapotranspiration (ETo) and Crop Coefficients to Estimate Crop Evapotranspiration (ETc) for Trees and Vines". These crop coefficients are designed for use with CIMIS ETo information. These leaflets are available by contacting :

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